

DOCKET NO: 220523US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
MAKOTO YONEYA, ET AL. : EXAMINER: NGUYEN, H. C.  
SERIAL NO: 10/070,908 :  
FILED: JULY 12, 2002 : GROUP ART UNIT: 2871  
FOR: LIQUID CRYSTAL DISPLAY :  
DEVICE :

REPLY BRIEF UNDER 37 C.F.R. § 41.41

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

Responsive to the Examiner's Answer of October 23, 2007, Appellants submit the following Reply Brief.

STATUS OF THE CLAIMS

Claims 1-22 are pending in the application. Claims 2, 8-20 and 22 are presently withdrawn from prosecution. Claims 1, 3-7 and 21 are rejected claims. The rejection of Claims 1, 3-7 and 21 is appealed.

GROUND OF REJECTION

Claims 1, 3-7 and 21 are rejected as anticipated under the meaning of 35 U.S.C. § 102(b) over a patent to Kim (U.S. 6,091,471). The Office asserts that Kim discloses all of the limitations of present Claim 1 (see pages 3 and 4 of the October 20, 2006 Office Action). In particular, the Office asserts that the liquid crystal displays having an in-lane switching mode inherently have interdigitated electrodes (see page 2 of the Advisory Action of

March 15, 2007). The Office asserts that Kim discloses a nematic liquid crystal cell having an in-plane switching mode (see page 2 of the Office Action of October 20, 2006). The Office asserts that an alignment layer having a pre-tilt layer of substantially 0° obtained by a rubbing treatment is disclosed in Figure 14 of Kim (see page 2 of the October 20, 2006 Office Action).

### ARGUMENT

The Examiner rejected Claims 1, 3-7 and 21 as anticipated over Kim (U.S. 6,091,471). On page 4 of the Examiner's Answer of October 23, 2007 it is stated that "a In-Plane Switching (col. 6 line 32) mode liquid crystal cell as [sic has] inherently a group of interdigitated electrodes ...". As the evidences which show that "the liquid crystal displays having an in-plane switching mode inherently have interdigitated electrodes", the Examiner presented Tomiooka (U.S. 6,682,783) and Held (U.S. 6,177,972). Appellants pointed out in the Appeal Brief filed on June 15, 2007 that the Office's assertion that liquid crystal cells having an in-plane switching mode inherently have interdigitated electrodes is not correct. See Appellants' arguments in section VII(a) on pages 3-5 of the Appeal Brief filed on June 15, 2007.

The "in-plane switching mode" claimed in the present application is a switching mode which has characteristic that the orientation of liquid crystal molecules or optical axis are/is switched in-plane, thereby a wide viewing angle is achieved. However, "the liquid crystal displays having an in-plane switching mode of liquid crystal molecules or optical axis" do not inherently have interdigitated electrodes.

Appellants provided factual evidence in the form of publications by Clark, Patel and Jaegemalm as proof that liquid crystal cells having an in-plane switching mode of liquid crystal molecules or optical axis and achieving a wide viewing angle do not inherently have

interdigitated electrodes. On pages 6-9 of the Examiner's Answer it is stated that Appellants' arguments are moot because the claims were not rejected over Clark, Patel or Jaegemalm.

Appellants submit that the Examiner's Answer misses the point; namely, Clark, Patel and Jaegemalm prove that liquid crystal cells having an in-plane switching mode do not inherently have interdigitated electrodes. Because liquid crystal cells having an in-plane switching mode do not inherently have interdigitated electrodes, the Examiner's rejection of the claims as anticipated by Kim for the reason "a In-Plane Switching mode liquid crystal cell as [sic has] inherently a group of interdigitated electrodes" is not supportable. The rejection of the claims as anticipated by Kim should therefore be overturned.

The Examiner's Answer appears to distinguish the liquid crystal displays of Clark, Patel and Jaegemalm on the basis that the devices do not generate an electric field having a component substantially parallel to the surfaces of the substrates. The Examiner's Answer again misses the point. The Office has broadly asserted that a liquid crystal cell operating with an in-plane switching mode inherently has a group of interdigitated electrodes. The Clark, Patel and Jaegemalm publications show that the Office's assertion is not correct.

Perhaps it is the Office's position that the Clark, Patel and Jaegemalm publications do not disclose a liquid crystal device operating in an in-plane switching mode because Clark, Patel and Jaegemalm do not disclose devices having electrodes that generate an electric field having a component substantially parallel to the surface of a substrate. Whether Clark, Patel and Jaegemalm generate an electric field having a component substantially parallel to the surface of a substrate is not the point. The point is that the devices of Clark, Patel and Jaegemalm operate by an in-plane switching mode of liquid crystal molecules or optical axis and do not have interdigitated electrodes. This fact refutes the Office's assertion that devices operating with an in-plane switching mode inherently have interdigitated electrodes.

It is not necessary for a device to generate an electric field having a component substantially parallel to the surface of a substrate in order for the device to operate with an in-plane switching mode of liquid crystal molecules or optical axis to achieve a wide viewing angle. Regardless that each of Clark, Patel and Jaegemalm describe devices which generate an electric field having a component substantially perpendicular to the surface of a substrate, these devices operate with an in-plane switching mode of liquid crystal molecules or optical axis and do not have interdigitated electrodes.

For example, Clark discloses a ferroelectric liquid crystal display that operates with an in-plane switching mode by application of a perpendicular electric field. Patel discloses a liquid crystal display that comprises a nematic liquid crystal and a chiral dopant and operates with an in-plane switching mode by application of a perpendicular electric field. Jaegemalm discloses a ferroelectric liquid crystal display that comprises a nematic liquid crystal and an alignment oxide silicon (SIO) evaporated layer and operates, using flexoelectric effect, with an in-plane switching mode by application of a perpendicular electric field.

Thus, each of Clark, Patel and Jaegemalm describe devices which operate with an in-plane switching mode of liquid crystal molecules or optical axis but do not have interdigitated electrodes.

Likewise, with respect to Appellants' argument that Tomioka (U.S. 6,682,783) and Held (U.S. 6,177,972) do not disclose that liquid crystal display devices having an in-plane switching mode inherently have interdigitated electrodes, the Examiner's Answer again misses the point. On pages 9-11 of the Examiner's Answer, as best it can be understood, it appears to be asserted that all liquid crystal display devices having an in-plane switching mode necessarily have interdigitated electrodes because:

- (1) the interdigitated electrodes and the in-plane-switching-mode electrode have identical structures (electrodes forming on one substrate) and

(2) the interdigitated electrodes and the in-plane-switching-mode electrode generate the similar electrical field (having component parallel to substrates).

As already discussed above, Clark, Patel, and Jaegemalm show that not all liquid crystal display devices having an in-plane switching mode of liquid crystal molecules or optical axis have interdigitated electrodes. Thus, interdigitated electrodes and electrodes which provide an “in-plane-switching-mode” do not necessarily have identical structures. Moreover, it is immaterial whether an interdigitated electrode and an in-plane switching mode electrode generate a similar electrical field. The question is whether all liquid crystal display devices having an in-plane switching mode of liquid crystal molecules or optical axis inherently have interdigitated electrodes. Clark, Patel and Jaegemalm prove that they do not. Therefore, the Examiner’s assertion that “the liquid crystal displays having an in-plane switching mode inherently have interdigitated electrodes” based on Tomioka and Held is not supportable. Thus, the Examiner’s assertion that Kim inherently describes all of the limitations of the presently claimed invention is not correct and the rejection of the present claims as anticipated over Kim should be withdrawn.

On pages 6-8 of the Appeal Brief (see section “B”) Appellants pointed out that Kim does not disclose a further limitation of the presently claimed invention; namely, that the pre-tilt angle of each liquid crystal anchoring direction with respect to a corresponding substrate surface is substantially zero degrees. Appellants have provided evidence that the figures of Kim indicate that the prior art pre-tilt angle is not substantially 0° as indicated by technical publications to Geary (*J. Appl. Phys.*, pp. 4100-4108) and Seo (*Jpn. J. Appl. Phys.*, pp. L503-L506) that explicitly state that rubbing treatment, i.e., the treatment used in Kim to align the Kim layers, cannot provide an alignment layer having a pre-tilt angle of substantially 0°. Kim uses a rubbing treatment to align the prior art layers. Geary and Seo show that a pre-tilt angle of substantially 0° cannot be obtained when rubbing treatment is used. Thus, Kim does

not disclose this aspect of the presently-claimed invention. Therefore, the Examiner's assertion that Kim inherently discloses all the features of the claimed invention is not correct. The rejection of the claims as anticipated by Kim should be overturned.

Further, Kim's diagrams show that the pre-tilt angle of the Kim device is not substantially 0°. Appellants provided evidence in the form of technical publications to Seo and Lien ("UV Modification of Service Pretilt of Alignment Layers for Multidomain Liquid Crystal Displays") as evidence that it is readily recognized by those of skill in the art that the symbols used in the Kim figures indicate that the Kim pre-tilt angle is not substantially 0° (see page 3, line 22 - page 5, line 20 of the July 31, 2006 Amendment filed in this case).

On pages 11 and 12 of the Examiner's Answer it is stated that Kim does in fact disclose a pre-tilt angle of substantially 0°. It appears that the Appellants' evidence in support of patentability was not given any consideration.

The second and third paragraphs on page 12 of the Examiner's Answer include descriptions of the Seo and Geary publications. The purpose of these nearly incomprehensible paragraphs is unclear.

Appellants pointed out that Broer is not prior art to the present application. Broer has an international filing date of December 10, 2001. The present application has an international filing date of July 9, 2001 (the present application is a 371 of PCT/JP01/05930). The U.S. effective filing date of the present application is therefore July 9, 2001, before the international filing date of Broer (i.e., December 10, 2001). Broer is therefore not prior art to the present application. Broer should not be cited as evidence contradicting the patentability of the presently claimed subject matter.

The Examiner's Answer continues to rely on Broer in disregard to the fact that Broer is not prior art to the present application.

For the reasons discussed above, Appellants submit that the rejection of the present claims as anticipated by Kim is not supportable and should be overturned. The Examiner's Answer fails to address points raised by Appellants in the Appeal Brief including (1) liquid crystal display devices having an in-plane switching mode do not inherently have interdigitated electrodes, (2) alignment layers having a pre-tilt angle of substantially 0° cannot be prepared using rubbing treatment, and (3) the Office's failure to give full consideration to factual evidence contradicting Office's characterization's of the prior art.

The rejections are therefore not supportable and should be overturned.


Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.  
Norman F. Oblon

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 08/07)

NFO:SUK\la

  
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Stefan U. Koschmieder, Ph.D.  
Registration No. 50,238

**BRADLEY D. LYTLÉ**  
**REGISTRATION NO. 40,073**